

Information for Healthcare Providers:

# CONTROLLING THE SPREAD OF RESPIRATORY ILLNESSES

including SARS



Division of Epidemiology and Immunization

The spread of most respiratory illnesses can be controlled through the use of good infection control practices. In the healthcare setting, proper hand hygiene, “respiratory hygiene,” transmission-based precautions, and the proper use of personal protective equipment (PPE) are effective ways of preventing the spread of respiratory illnesses.

This booklet provides information and resources to help you protect yourself, your coworkers, and your patients from respiratory illnesses.

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## TRANSMISSION OF RESPIRATORY PATHOGENS

Knowing the ways communicable diseases are transmitted is important for implementing proper infection control and prevention. There are a number of important routes of transmission including contact, droplet (respiratory secretions), airborne, and common vehicle (such as food, water, etc.). Common vehicle transmission is usually not a significant mode of transmission for respiratory pathogens in the healthcare setting. Most respiratory illnesses are spread primarily through contact, droplet, or through the air.

**Contact** is the most frequent mode of transmission of nosocomial infections. There are two major subgroups: direct-contact transmission and indirect-contact transmission.

Direct-contact transmission involves a direct person-to-person contact, which results in the physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as when a person performs patient care activities that require direct personal contact. Direct-contact transmission also can occur between two patients.

Indirect-contact transmission involves contact of a susceptible host with contaminated objects, such as instruments, needles, or dressings; contaminated hands that are not washed; or gloves that are not changed between patients.

**Droplets** (respiratory secretions) are generated by a person primarily during coughing, sneezing, and talking, and during the performance of certain procedures, such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from the infected person are propelled a short distance through the air (less than three feet) and are deposited on the recipient's conjunctivae, nasal mucosa, or mouth. **"Droplet" transmission is not true airborne transmission**, because droplets do not remain suspended in the air. Special air handling and ventilation are not required.

**Common vehicle transmission** applies to microorganisms transmitted by contaminated items such as food, water, medications, devices, and equipment.

**Airborne transmission** occurs by dissemination of either airborne droplet nuclei (small-particle residue [5µm or smaller in size] of evaporated droplets containing microorganisms that remain suspended in the air for long periods of time), or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Microorganisms transmitted by airborne transmission include *Mycobacterium tuberculosis*, measles virus and varicella virus.

## SURVEILLANCE AND REPORTING OF INFECTIOUS DISEASES

Infectious diseases in Massachusetts are reportable to the local board of health or the Massachusetts Department of Public Health (MDPH) according to Reportable Diseases and Isolation and Quarantine Requirements (105 CMR 300.000).

The regulations cover: how and where reports should be sent; information required in reports; definition of specific terms; issues of confidentiality; temporary reporting requirements on an emergency basis; laboratory reporting; and, access to medical records.

The content of the regulations may be found in the document entitled *Summary of Reportable Diseases and Isolation and Quarantine Requirements February 2003* and may be accessed on the MDPH web site at [www.state.ma.us/dph](http://www.state.ma.us/dph).

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## ISOLATION AND QUARANTINE

To control the spread of a contagious disease, public health authorities rely on many strategies. Two of these strategies are isolation and quarantine. Both are common practices in public health and both aim to control exposure to infected and potentially infected individuals.

### ***Isolation: For People Who Are Ill***

Isolation is the separation of persons who have a specific infectious disease, and are infectious, from the general population to help prevent spread of this disease. Isolation may be voluntary or compelled on a mandatory basis through legal authority. People ordered into isolation may be cared for in their homes, hospitals, or in other healthcare settings.

### ***Quarantine: For People Who Have Been Exposed But Are Not Ill***

Quarantine is the separation and restriction of movements of persons who have been exposed to an infectious agent but are not yet ill. These individuals are potentially infectious and the quarantine is intended to stop the potential spread of the disease. Quarantine may be voluntary or compelled on a mandatory basis by legal authority and may be applied on an individual or group level. Quarantine is usually enforced in a home setting but other facilities may also be utilized for quarantine.

### ***Legal Authority For Isolation and Quarantine***

Isolation and/or quarantine may be instituted by public health officials in the event of an outbreak of a disease dangerous to the public's health. "Police powers," or the authority of a state government to enact laws and promote regulations to safeguard the health, safety and welfare of its citizens, authorize states to compel isolation and quarantine. The Massachusetts Department of Public Health (MDPH), in cooperation with local public health authorities, has the legal authority to enforce isolation and quarantine (105 CMR 300.200).

Federal isolation and quarantine orders are issued through executive order of the President. Quarantinable diseases include: cholera, diphtheria, infectious tuberculosis, plague, smallpox, yellow fever and viral hemorrhagic fevers. On April 4, 2003 SARS was added to the list of federally quarantinable diseases.

# LABORATORY TESTING OF RESPIRATORY PATHOGENS

The Massachusetts Department of Public Health State Laboratory Institute (SLI) provides diagnostic testing of bacterial and viral pathogens. Examples of available diagnostic tests and respective respiratory pathogens include:

***Viral isolation by cell culture followed by identification:***

- Influenza
- Parainfluenza 1-3
- Adenovirus
- Respiratory syncytial virus (RSV)

***EIA and real time PCR:***

- Severe Acute Respiratory Syndrome (SARS)

***Cell culture and real time PCR:***

- Varicella zoster virus (VZV)

***EIA and cell culture:***

- Measles

***EIA:***

- Pertussis

A complete list of tests conducted at SLI, including specimen collection and submission information, is available at: [www.state.ma.us/dph](http://www.state.ma.us/dph).

## GENERAL INFECTION CONTROL MEASURES

Implementation and adherence to infection control practices are the keys to preventing the transmission of infectious diseases, including respiratory diseases spread by droplet or airborne routes. Recommended infection control practices include:

- 1) Hand hygiene;
- 2) Standard Precautions/Transmission-Based Precautions (Contact, Droplet, Airborne); and
- 3) Respiratory hygiene.

When followed properly, each of these practices decreases the risk of spreading common respiratory pathogens. However, hand hygiene is the single most effective means of preventing the spread of all infections among hospital patients and personnel.

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## Hand Hygiene

**Proper hand hygiene is the most effective way to prevent the spread of infection.** Detailed hand hygiene information is available on the CDC website at [www.cdc.gov/handhygiene](http://www.cdc.gov/handhygiene). To properly wash and clean hands, the following procedure should be followed:

- Wash hands when they are **visibly dirty** or soiled with blood or other body fluids. **Wash hands with either a non-antimicrobial soap or an antimicrobial soap and water.** When washing hands with soap and water, wet hands first with water, apply to hands the amount of product recommended by the manufacturer, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet.
- **If hands are not visibly soiled, an alcohol-based hand rub or gel may be used in place of soap and water.** When using an alcohol-based hand rub or gel, apply product to the palm of one hand and rub hands together, covering all surfaces of hands and fingers, until the hands are dry.
- Avoid wearing artificial fingernails when caring for patients at high risk for infection, and keep natural nail tips less than 1/4-inch long.
- Wear gloves when contact with blood or other potentially infectious materials, mucous membranes, and nonintact skin could occur.
- Remove gloves after caring for a patient. Always perform hand hygiene after removing gloves. Do not wear the same pair of gloves for the care of more than one patient, and do not wash gloves between uses with different patients.
- Change gloves during patient care if moving from a contaminated body site to a clean body site.

## Standard Precautions

The Standard Precautions/Transmission-Based Precautions system is designed to prevent the transmission of infectious agents. It requires the use of work practice controls and protective apparel for all contact with blood and body substances, but uses Airborne Infection Isolation, Droplet, and Contact Precautions for patients with diseases known to be transmitted in whole or in part by those routes. **Standard Precautions** include consistent and prudent preventive measures to be **used at all times** regardless of a patient's infection status, and include:

### Standard Precautions include:

Hand hygiene. Practice hand hygiene after touching blood, body fluids, secretions, excretions, or contaminated items, whether or not gloves are worn. Wash hands immediately after gloves are removed, between patient contacts, and when otherwise indicated to avoid transfer of microorganisms to other patients or environments.

Gloves. Wear gloves (clean, nonsterile gloves are adequate) when touching blood, body fluids, secretions, excretions, or contaminated items. Put on clean gloves just before touching mucous membranes and nonintact skin. Change gloves between tasks and procedures.

**Practice hand hygiene whenever gloves are removed.**

Mask, eye protection/face shield. Wear a mask and adequate eye protection (eyeglasses are not acceptable), or a face shield to protect mucous membranes of the eyes, nose, and mouth during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.

Gown. Wear a gown (a clean, nonsterile gown is adequate) to protect skin and to prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions. Remove a soiled gown as promptly as possible, with care to avoid contamination of clothing, and wash hands.

Patient care equipment. Handle used patient care equipment soiled with blood, body fluids, secretions, or excretions in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to one's self, other patients and environments. Ensure that reusable equipment is not used for the care of another patient until it has been cleaned and sanitized appropriately. Ensure that single-use items are discarded properly.

## Contact Precautions

In addition to Standard Precautions, Contact Precautions should be used for the care of patients known or suspected to have illnesses that can be spread by usual contact with an infected person, or the surfaces or patient care items in the room.

### Example of diseases/organisms requiring Contact Precautions include:

- o Severe Acute Respiratory Syndrome (SARS): See “SARS Infection Control” section
- o Parainfluenza virus
- o Respiratory syncytial virus
- o Varicella (chickenpox): Also requires Airborne Infection Isolation
- o Herpes Zoster (disseminated or in the immunocompromised host): Also requires Airborne Infection Isolation

### Contact Precautions include:

#### Gloves and hand hygiene.

Wear gloves when entering the room. During the course of providing care for a patient, change gloves after having contact with infective material. Remove gloves before leaving the patient's room and practice hand hygiene immediately with an antimicrobial agent or a waterless antiseptic agent. After glove removal and hand washing, ensure that hands do not touch potentially contaminated surfaces or items in the patient's room.

Gown. Wear a gown when entering the room. Remove the gown before leaving the patient's environment. After gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces. Wash hands.

Patient transport. Limit the movement of the patient from the room to essential purposes only. During transport, ensure that all precautions are maintained.

Patient care equipment. When possible, dedicate the use of noncritical patient care equipment to a single patient (or cohort of patients infected or colonized with the pathogen requiring precautions) to avoid sharing between patients. If use of common equipment or items is unavoidable, then adequately clean and disinfect them before use for another patient.

Patient placement (private room). Place the patient in a private room. If a private room is not available, place the patient in a room with other patients with the same illness (cohorting).

## Droplet Precautions

In addition to Standard Precautions, use Droplet Precautions for a patient known or suspected to be infected with microorganisms transmitted by droplets (large-particle, wet droplets [larger than 5µm in size]) that can be generated by the patient during coughing, sneezing, talking, or the performance of procedures.

### Examples of diseases/organisms requiring Droplet Precautions include:

- o Invasive *Hemophilus influenzae* disease: meningitis, pneumonia (in infants and small children), epiglottitis
- o Invasive *Neisseria meningitidis* disease: meningitis, pneumonia, and bacteremia
- o Mycoplasma pneumonia
- o Group A streptococcal pneumonia, pharyngitis, or scarlet fever in infants and young children
- o Influenza
- o Adenovirus: Also requires Contact Precautions
- o Parvovirus B19
- o Rubella

### Droplet Precautions include:

Patient placement. Place the patient in a private room. When a private room is not available, place the patient in a room with a patient(s) who has active infection with the same microorganism but with no other infection (cohorting). When a private room is not available and cohorting is not achievable, maintain spatial separation of at least three feet between the infected patient and other patients and visitors. Special air handling and ventilation are not necessary, and the door may remain open.

Mask. In addition to standard precautions, wear a mask or respirator when working within three feet of the patient. (Hospitals may want to implement the wearing of a mask to enter the room.)

Patient transport. Limit the movement and transport of the patient from the room to essential purposes only. If transport or movement is necessary, minimize patient dispersal of droplets by masking the patient, if possible.

## Airborne Infection Isolation

In addition to Standard Precautions, Airborne Infection Isolation measures are designed to reduce the risk of transmission of infectious agents that may be suspended in the air in either small particle aerosols or dust particles. Patients requiring Airborne Infection Isolation must be given a private room with special air handling and ventilation (negative pressure). Respiratory protection for healthcare workers is necessary when entering the patient's room.

### Examples of diseases/organisms requiring Airborne Infection Isolation include:

- o SARS: See “SARS Infection Control” section
- o Tuberculosis (pulmonary or laryngeal, suspected or confirmed)
- o Varicella: Also requires Contact Precautions
- o Herpes Zoster (shingles) in an immunocompromised patient: Also requires Contact Precautions
- o Measles (rubeola)

### Airborne Infection Isolation includes:

Patient placement. Airborne Infection Isolation requires a negative pressure room in addition to a private room. Keep the room door closed and the patient in the room. When a private room is not available, place the patient in a room with a patient who has active infection with the same microorganism, but with no other infection (cohorting).

Respiratory protection. Respiratory protection must be worn when entering the room of a patient in Airborne Infection Isolation. A NIOSH-certified, fit-tested disposable N-95 respirator mask is recommended for all persons entering the room, including visitors. The use of higher-level respirators may be considered for certain procedures. If a particulate respirator with filter efficiency of 95% or greater is not available, a surgical mask should be worn. The mask should fit tightly around the nose and mouth to protect against large droplet transmission.

## *Respiratory Hygiene/Cough Etiquette*

“Respiratory hygiene” is a term that has been adopted by the Centers for Disease Control and Prevention (CDC) and the Massachusetts Department of Public Health (MDPH) to describe measures that can be taken to decrease the risk of spreading respiratory pathogens. A universal “respiratory hygiene/cough etiquette” strategy for a healthcare facility should include the following:

- o Place signs at the entrances of all outpatient facilities requesting that patients and visitors inform healthcare personnel of respiratory symptoms upon registration.
- o Provide masks (e.g., surgical) for all patients presenting with respiratory symptoms (especially cough) and provide instructions on the proper use and disposal of masks.
- o If a patient cannot wear a mask, provide tissues and instructions on when to use them (i.e., when coughing, sneezing or controlling nasal secretions), how and where to dispose of them, and the importance of hand hygiene after handling this material (cough etiquette).
- o Provide hand hygiene materials in waiting room areas and encourage patients with respiratory symptoms to wash their hands.
- o If possible, designate an area in waiting rooms where patients with respiratory symptoms can be segregated (ideally by more than three feet) from other patients without respiratory symptoms.
- o Place patients with respiratory symptoms in a private room or cubicle as soon as possible for further evaluation.
- o Healthcare workers evaluating patients with respiratory symptoms should wear a surgical or procedure mask.
- o Consider the installation of Plexiglas barriers at the point of triage or registration to protect healthcare workers.
- o If a physical barrier is not possible, instruct registration and triage staff to remain at least three feet from unmasked patients. Staff should consider wearing a surgical mask during registration and triage.
- o Continue to use Droplet Precautions to manage patients with respiratory symptoms until it is determined that the cause of symptoms is not an infectious agent that requires precautions beyond Standard Precautions.

## CLEANING AND DISINFECTION

Cleaning and disinfection of environmental surfaces are important components of routine infection control in healthcare facilities. Although environmental surfaces (e.g., floors, table tops) are generally not involved in transmission of microorganisms, some surfaces, especially those that are touched frequently (e.g., bed rails, door knobs, lavatory surfaces), may serve as reservoirs of microbial contamination. When these surfaces are touched, the microbial agents can be transferred to the nose, mouth, eyes, or other environmental surfaces.

This section contains general cleaning and disinfecting guidelines. Specific guidelines for cleaning and disinfecting provider offices, in-patient settings, and emergency medical services are outlined in the *SARS Surveillance and Response Plan for Massachusetts*, available at [www.state.ma.us/dph](http://www.state.ma.us/dph). Additional information regarding cleaning and disinfecting is available on the CDC website at [www.cdc.gov/ncidod/sars](http://www.cdc.gov/ncidod/sars).

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General cleaning and disinfecting guidelines include the following:

- o Any EPA-registered hospital detergent-disinfectant currently used by healthcare facilities for environmental sanitation may be used. Manufacturer recommendations for concentration, contact time, and care in handling should be followed.
- o Personal Protective Equipment (PPE), as outlined in the “General Infection Control” section of this booklet, should be worn when cleaning surfaces or equipment currently or previously occupied by or used for a person who is ill.
- o Patient care areas should be kept free of unnecessary items and equipment to limit contamination.
- o On a daily basis, horizontal surfaces (bed tables), surfaces frequently touched by patient and staff (bed rails, doorknobs), and lavatory facilities should be cleaned and disinfected.
- o Once a patient has been discharged from a room, the door should be closed for one hour prior to cleaning and disinfecting.
- o Once a patient has been discharged from a room or area, in addition to the daily cleaning procedures listed, soiled vertical surfaces, durable patient equipment, and curtain dividers should be cleaned and disinfected.
- o Walls and drapes do not need to be disinfected unless obviously soiled.
- o Patient care equipment should be disinfected according to established CDC and manufacturer guidelines.
- o Used cleaning solutions should be discarded and housekeeping equipment should be rinsed and allowed to dry prior to reuse.
- o Trash saturated with blood or body fluids should be disposed of in an appropriate biohazard container and treated accordingly; items not saturated may be discarded as routine medical waste.
- o Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. All soiled linen should be bagged or put into carts at the location where it was used; it should not be sorted or pre-rinsed in patient care areas. Linen soiled with blood or body fluids should be deposited and transported in bags that prevent leakage.



SARS OVERVIEW

Severe Acute Respiratory Syndrome (SARS) is a respiratory illness caused by a novel coronavirus (SARS-CoV). In early 2003, transmission within healthcare facilities accounted for a large proportion of SARS cases. In addition to healthcare workers who cared for SARS patients, other patients and visitors were often affected and contributed to the spread of the virus, both in the hospital and throughout the community. The remaining sections of this booklet provide information and resources to help you protect yourself, your coworkers, and your patients from SARS.

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## TRANSMISSION OF SARS-CoV

SARS-CoV is spread primarily through droplets (respiratory secretions) and close person-to-person contact. Close contact is defined as having cared for, lived with, or direct contact with the respiratory secretions and/or body fluids of a person with SARS. Although not proven, it is possible that SARS-CoV can also be spread more broadly through the air (airborne), by touching objects that have come in contact with the SARS virus or by fecal contamination, as the virus can be excreted in the stool.

Because respiratory droplets are the primary method of transmission, the first line of defense for prevention and control of SARS is proper hand hygiene and the implementation of a universal “respiratory hygiene” strategy as described in the “General Infection Control” section of this booklet.

In the absence of a vaccine or effective treatment, the best way to limit the impact of SARS is to rapidly identify persons possibly infected with SARS-CoV and to activate the following control measures to prevent the spread of the virus:

- o Disease surveillance;
- o Detection and isolation of cases;
- o Identification and monitoring of case contacts;
- o Adherence to infection control precautions; and if necessary
- o Restriction of movement of potentially infected persons.

# SARS CASE DEFINITION

Presumptive diagnosis of SARS-CoV infection depends upon both clinical criteria and exposure criteria as defined by the case definition. The case definition for SARS-CoV continues to change as more is learned about the virus, but it encompasses assessment of the following variables:

## Clinical Criteria

- o Symptoms including:
  - Fever, and
  - Cough, shortness of breath, or other lower respiratory tract symptoms; and in some cases
  - Progressive pneumonia or adult respiratory distress syndrome (ARDS)
- o Other symptoms may include:
  - Chills, rigors
  - Malaise
  - Myalgia
  - Diarrhea
  - Sore throat
  - Headache
- o Age of patient

## Exposure Criteria

- o Travel history
- o Close contacts
- o High-risk occupation

The most up-to-date case definition can be found by visiting the following websites:

- o **Centers for Disease Control and Prevention (CDC):**  
[www.cdc.gov/ncidod/sars/casedefinition.htm](http://www.cdc.gov/ncidod/sars/casedefinition.htm)
- o **The Council of State and Territorial Epidemiologists (CSTE):**  
[www.cste.org](http://www.cste.org)
- o **The World Health Organization (WHO):**  
[www.who.int/csr/sars/en](http://www.who.int/csr/sars/en)
- o **The Massachusetts Department of Public Health (MDPH):**  
[www.state.ma.us/dph](http://www.state.ma.us/dph)

Contact the Massachusetts Department of Public Health (MDPH), Division of Epidemiology and Immunization at 617-983-6800 with questions pertaining to the case definition, testing, diagnosis of SARS, or reporting of a suspected case.

## SARS CASE REPORTING

SARS is a reportable disease in Massachusetts (in accordance with 105 CMR 300.000). Suspect cases of SARS should be reported to the Massachusetts Department of Public Health (MDPH) by calling 617-983-6800.

If a case is confirmed as SARS-CoV infection per the current CDC case definition, a SARS case report form must be completed and faxed to the MDPH Division of Epidemiology and Immunization at 617-983-6813. Forms can be obtained by visiting [www.state.ma.us/dph](http://www.state.ma.us/dph). This information will help MDPH identify likely sources of exposure and other potential cases.

MDPH staff will notify the local public health officials in the city/town where the case (probable or confirmed) resides. Other cities/towns affected will also be notified.

## SARS SURVEILLANCE

SARS surveillance is taking place at the international, national, state, and local levels. The type and extent of surveillance depends on whether or not SARS has been identified outside or within the United States.

### ***International Surveillance***

The World Health Organization (WHO) is responsible for international surveillance and reporting of SARS. The most up-to-date information can be found by visiting: [www.who.int/csr/sars/en/](http://www.who.int/csr/sars/en/).

### ***National Surveillance***

The Centers for Disease Control and Prevention (CDC) maintains national SARS surveillance. The CDC SARS website is kept current with information for healthcare providers, public health professionals, and the general public. Visit [www.cdc.gov/ncidod/sars/](http://www.cdc.gov/ncidod/sars/) for the most up-to-date information.

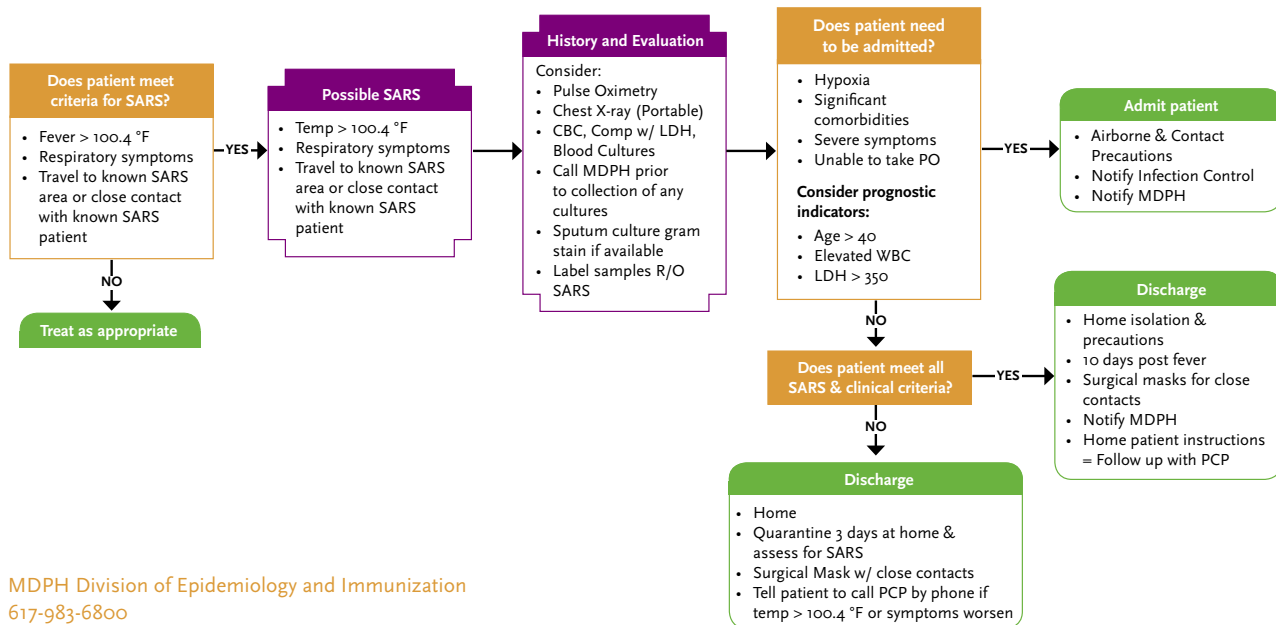
### ***Massachusetts Surveillance***

The Massachusetts Department of Public Health (MDPH) maintains state SARS surveillance. MDPH has developed a state surveillance and response plan to help identify, manage, and control SARS. The plan is available on the MDPH website, [www.state.ma.us/dph](http://www.state.ma.us/dph), along with updated SARS information for healthcare providers, public health professionals, and the general public. Healthcare providers with questions or seeking additional information can call the MDPH Division of Epidemiology and Immunization at 617-983-6800.

## SARS DIAGNOSTIC ALGORITHM

*Adapted for use with permission from Heywood Hospital, MA*

The following algorithm has been developed to help diagnose SARS-CoV in patients presenting to the emergency department.



MDPH Division of Epidemiology and Immunization  
617-983-6800

## ISOLATION AND QUARANTINE: SARS

Severe Acute Respiratory Syndrome (SARS) is a reportable disease in Massachusetts (in accordance with 105 CMR 300.000).

Isolation is the separation of a symptomatic person from the general population to prevent the spread of disease.

- o Isolation of a person for SARS should occur immediately upon the identification of a case of suspected or confirmed SARS-CoV infection.
- o Isolation should be implemented as described in the “General Infection Control” section of this booklet.
- o A person with SARS must stay in isolation for 10 days after resolution of fever, given respiratory systems are absent or resolving, or until a diagnosis of SARS-CoV disease has been ruled out.

Quarantine is the separation and restriction of movements of persons who have been exposed to an infectious agent but are not yet ill. Individuals may be quarantined at home or in a hospital setting.

- o Regarding SARS, individuals with fever and/or respiratory symptoms who are hospitalized are considered to be symptomatic and subject to isolation.
- o For persons who are not hospitalized, persons who may be placed in quarantine include those who are:
  - Symptomatic: Individuals who have respiratory symptoms or fever, and are close contacts of a SARS-CoV case, or
  - Asymptomatic: Individuals who are close contacts of a SARS-CoV case during significant community-wide outbreak.

More information about isolation and quarantine, including authority, when and how, and enforcement, is available in the *SARS Surveillance and Response Plan for Massachusetts*, and can be obtained by visiting [www.state.ma.us/dph](http://www.state.ma.us/dph), or by calling 617-983-6800. For information on how to legally prepare for SARS quarantine and isolation, see the “Command and Control” section of the CDC Preparedness and Response to SARS Plan available at [www.cdc.gov/ncidod/sars/pdf/sars](http://www.cdc.gov/ncidod/sars/pdf/sars).

## SARS TESTING

There are currently two tests available for the detection of SARS-CoV infection in humans. In Massachusetts, these tests are available **only** at the MDPH State Laboratory Institute (SLI) with confirmation provided by the Centers for Disease Control and Prevention (CDC).

The tests include:

- o Enzyme immunoassay (EIA) and immunofluorescence assay (IFA) for the detection of antibodies in serum, and
- o Reverse transcriptase polymerase chain reaction (RT-PCR) for the detection of viral RNA in specimens from the respiratory tract and other samples.

These tests are considered investigational; therefore, a reasonable effort must be made to obtain informed consent from patients before collecting samples for testing.

All cases of suspected or probable SARS should be reported to the MDPH Division of Epidemiology and Immunization at 617-983-6800 prior to sending samples for testing. Suspect cases of SARS will be reviewed and a determination will be made regarding testing.

### Laboratory Testing For SARS

Laboratory testing for SARS-CoV will be performed at the SLI, and will be approved on an individual basis upon consultation with MDPH staff. The MDPH Division of Epidemiology and Immunization staff can be reached 24 hours per day, 7 days per week by calling 617-983-6800.

Testing criteria will vary depending upon whether or not cases of SARS exist in the world. SARS laboratory testing criteria, and specimen collection information are detailed in the *SARS Surveillance and Response Plan for Massachusetts*, available on the MDPH website at [www.state.ma.us/dph](http://www.state.ma.us/dph), or by calling 617-983-6800.

## ALGORITHM FOR RECOMMENDING TESTING FOR SARS CORONAVIRUS—POST-EVENT PHASE

*(SARS identified somewhere in the world)*

**Person over 18 years hospitalized with chest x-ray confirmed pneumonia:**

Ask patient:

1. Have you traveled to an area currently experiencing SARS in the 10 days prior to onset of symptoms?
2. Do you have contacts who became ill within 10 days of travel outside the US? Where did they travel?
3. Are you a healthcare worker with direct patient care?
4. Do you have any close contacts who currently/recently had pneumonia without a known etiology?



If patient answers “yes” to at least one of the questions and an alternative diagnosis is not ruled out in 72 hours and upon MDPH approval, submit specimens to MDPH State Laboratory Institute for SARS testing. Call (617) 983-6800 to report the case prior to submitting the specimen.

**OR**

**Fever ( $>100.4^{\circ}\text{F}$ ) or Respiratory Symptoms or Radiographic evidence of pneumonia or ARDS in a:**

1. Person with travel within 10 day of onset to area currently experiencing SARS
- OR
2. Contact within 10 days of onset with a person known or suspected to have SARS



Upon MDPH approval, submit specimens to MDPH State Laboratory Institute for SARS testing. Call (617) 983-6800 to report the case prior to submitting the specimen.



## INFORMED CONSENT AND SPECIMEN COLLECTION FOR SARS

**Informed Consent.** A reasonable effort must be made to have informed consent forms signed by the patient or guardian before obtaining specimen samples to be sent to MDPH for testing. A separate form is required for each test (EIA and RT-PCR). Forms can be obtained from the CDC website at [www.cdc.gov/ncidod/sars/lab/eia/consent.htm](http://www.cdc.gov/ncidod/sars/lab/eia/consent.htm).

If after consultation with an MDPH Epidemiologist it is necessary to send specimens to the MDPH State Laboratory Institute, the following paperwork must be submitted:

- o Informed consent forms (as above)
- o CDC Specimen Report Form: Available at [www.cdc.gov/ncidod/sars/pdf/specimensubmissionform-sars.pdf](http://www.cdc.gov/ncidod/sars/pdf/specimensubmissionform-sars.pdf)
- o MDPH State Laboratory Institute Specimen Submission Form: Available at [www.state.ma.us/dph](http://www.state.ma.us/dph)

**Specimen Collection.** To maximize the likelihood of identifying evidence of SARS-CoV infection, multiple types of specimens should be collected from each patient multiple times during his/her illness. In general, specimens include:

- o **Upper respiratory tract specimens**
  - Nasopharyngeal wash/aspirate
  - Nasopharyngeal or oropharyngeal swabs
- o **Lower respiratory tract**
  - Sputum (deep cough)
  - Bronchoalveolar lavage
  - Tracheal aspirate
  - Pleural tap
- o **Blood**
  - Serum
  - EDTA blood/plasma
- o **Stool**

Detailed information about specimen type and collection procedure(s) is outlined in the *SARS Surveillance and Response Plan for Massachusetts*, available on the MDPH website at [www.state.ma.us/dph](http://www.state.ma.us/dph), or by calling 617-983-6800.

## INFECTION CONTROL MEASURES FOR SARS

SARS-CoV is spread primarily through droplets (respiratory secretions) and close person-to-person contact. Large droplets are believed to be the primary route of infection. Close contact is defined as having cared for, lived with, or direct contact with the respiratory secretions and/or body fluids of a person with SARS. Although not proven, it is possible that SARS-CoV can also be spread more broadly through the air (airborne), by touching objects that have come in contact with the SARS virus, or by fecal contamination as the virus is excreted in the stool.

Because respiratory droplets are the primary method of transmission of SARS-CoV, the first line of defense for prevention and control of SARS is to practice:

- o Standard Precautions;
- o Contact Precautions;
- o Airborne Infection Isolation; and
- o Respiratory Hygiene.

General infection control guidelines are outlined in the section of this booklet entitled, “General Infection Control.” Information specific to emergency medical services personnel, healthcare personnel, and patients in in-patient settings, the community, workplaces, and schools is available in the *SARS Surveillance and Response Plan for Massachusetts*, available at [www.state.ma.us/dph](http://www.state.ma.us/dph). Additional information regarding infection control practices is available on the CDC website at [www.cdc.gov/ncidod/hip/isolat/isolat.htm](http://www.cdc.gov/ncidod/hip/isolat/isolat.htm).

Healthcare professionals who have contact with a person(s) suspected of having SARS should monitor themselves, and immediately contact employee health if respiratory or flu-like symptoms compatible with SARS develop.

Infection control measures for SARS include both Contact Precautions and Airborne Infection Isolation. (See the “General Infection Control” section of this booklet.) In addition to these precautions, the following should receive special attention:

### ***Personal Protective Equipment (PPE)***

The proper use of personal protective equipment (PPE) can keep you, your coworkers, and your patients healthy by preventing the spread of infectious diseases. In a healthcare setting, PPE for SARS should include:

- o Gloves
- o Disposable gown
- o Eye protection (regular eyeglasses are not enough)
- o Appropriate fit-tested respirators (N-95 or higher)

Hand hygiene is also an essential personal protective practice against SARS.

Updated information on SARS and PPE can be obtained by visiting: [www.cdc.gov/ncidod/sars/](http://www.cdc.gov/ncidod/sars/).

### ***Respirator Use***

Large droplets are believed to be the primary route of infection of SARS-CoV. It remains unclear whether SARS-CoV is transmitted by a true airborne route. As a result, Airborne Infection Isolation is advised for hospitalized SARS patients. A NIOSH-certified, fit-tested disposable N-95 respirator mask is recommended for protection from SARS. The use of higher-level respirators should be considered when employing droplet- and aerosol-generating devices and procedures such as ventilators, nebulizers, and endotracheal intubation.

If respirators are not available, a tight-fitting surgical mask should be worn around the nose and mouth. A tight-fitting surgical mask will protect against the spread of large droplets, believed to be the main route of infection of SARS. However, surgical masks cannot completely protect against the potential airborne spread of SARS.

### ***Patient Placement***

- Patients with or suspected of having SARS should be placed on Airborne Infection Isolation in a negative pressure room.
- Designate “clean” and “dirty” areas for isolation materials. Maintain a stock of clean patient care and PPE supplies outside the patient’s room. Decide where contaminated linen and waste will be placed. Locate receptacles close to the point of use and separate from the clean supplies. Also designate the location where reusable PPE (e.g., goggles, face shields) will be placed for cleaning and disinfection before reuse.
- Limit the amount of patient care equipment brought into the room to that which is medically necessary. Provide each patient with patient-dedicated equipment (e.g., thermometer, blood pressure cuff, stethoscope).
- Limit staff to the number sufficient to meet patient care needs. Using staff who have been specially trained to care for patients with SARS may reduce opportunities for exposure, increase adherence to recommended infection control practices, and promote continuity of care.

### ***Patient Transport***

- Limit patient movement and transport outside the isolation room to medically necessary purposes. Whenever possible, use portable equipment to perform x-rays and other procedures in the patient’s room.
- If transport or movement is necessary, ensure that the patient wears a surgical mask, puts on a clean patient gown, and performs hand hygiene before leaving the room. If a mask cannot be tolerated (e.g., due to the patient’s age or deteriorating respiratory status), apply the most practical measures to contain respiratory secretions.
- Limit contact between SARS patients and others by using less traveled hallways and elevators when possible.

### ***Linen and Laundry***

Contact with textiles has not been implicated in the transmission of SARS-CoV. Therefore, no special handling procedures are recommended for linen and laundry that may be contaminated with SARS-CoV.

- Store clean linen outside patient rooms, taking into the room only linen needed for use during the shift.
- Place soiled linen directly into a laundry bag in the patient's room. Contain linen in a manner that prevents the linen bag from opening or bursting during transport and while in the soiled linen holding area.

### ***Cleaning and Disinfection***

The SARS virus can remain infectious on surfaces for up to 24 hours. Although little is known about the extent of environmental contamination in SARS patients' rooms, epidemiologic and laboratory evidence suggests that the environment could play a role in transmission. Therefore, cleaning and disinfection are critical to the control of SARS-CoV transmission. Environmental cleaning and disinfection for SARS-CoV follows the same principles described in the "Cleaning and Disinfection" section of this booklet.

### ***Visitors***

- Limit visits to patients with known or possible SARS-CoV disease to persons who are necessary for the patient's emotional well-being and care.
- Visitors who have been in contact with the patient are a possible source of SARS-CoV. Therefore, schedule and control visits to allow for appropriate instruction on use of PPE and other precautions (e.g., hand hygiene, limiting surfaces touched) while in the patient's room.

## GLOSSARY OF TERMS

### **AIRBORNE INFECTION ISOLATION**

The use of specific administrative, engineering, and work practices to reduce the spread of infectious diseases through the air. Work practices include the use of an Airborne Infection Isolation Room (AIIR), which has negative pressure relative to the surrounding area.

### **CASE (SARS, CONFIRMED)**

A person who has a clinically compatible illness that is laboratory confirmed.

### **CASE (SARS, PROBABLE)**

A person who meets both the clinical criteria for severe respiratory illness and the epidemiological criteria for likely exposure to SARS-CoV.

### **CLOSE CONTACT (SARS)**

A person who has lived with or cared for someone with SARS-CoV, or had direct contact with the droplets (respiratory secretions) or body fluids of a person with SARS-CoV. Close contact does not include sitting across a waiting room or office for a short period of time.

### **COHORTING**

The isolation of groups of patients with the same infectious disease. Cohorting is used as a means of reducing the spread of a disease when space limitations prevent patients from being isolated individually.

### **CONTACT (SARS)**

A person who has been exposed to a SARS case during the infectious period.

### **CONTACT PRECAUTIONS**

The use of specific work practices and personal protective equipment to control the spread of infection through direct or indirect contact with an infected person. Direct contact means any physical contact between an infected and non-infected person. Indirect contact means any contact between a non-infected person and any object that has been infected through contact with an infected person.

### **DROPLET PRECAUTIONS**

The use of specific work practices to reduce the spread of infectious diseases by droplets (respiratory secretions).

### **HAND HYGIENE**

A general term that applies to hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antiseptic.

## **INFECTION CONTROL**

The use of hand hygiene, personal protective equipment, and specific work practices undertaken by healthcare workers in healthcare centers to reduce the spread of infectious diseases. The infection control actions taken depend on the way a disease is spread and can include Standard, Contact, Droplet, and/or Airborne precautions.

## **ISOLATION**

The separation of people who are ill with a specific contagious disease to stop the spread of disease. Isolation can be voluntary or mandatory, applied to people or groups, and take place in homes, hospitals, or community isolation centers.

## **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

A range of gear including gloves, disposable gowns, eye protection, and appropriate respirators and masks worn by healthcare workers to protect themselves and others from, and to reduce the spread of contagious diseases.

## **QUARANTINE**

The separation of people who are well but are believed to have been exposed to a contagious disease to stop the disease's spread. Quarantine can be voluntary or mandatory, applied to people or groups, and take place in homes, hospitals, or community isolation centers. Quarantine can also mean the restriction of movement into and out of a building or place such as a hospital.

## **RESPIRATORY HYGIENE**

The use of surgical masks (or tissues when masks are not available to cover mouth and nose when coughing or sneezing), hand hygiene procedures, and physical distancing of persons with respiratory symptoms to reduce the spread of SARS and other respiratory diseases.

## **SARS**

A severe respiratory illness caused by a coronavirus (SARS-CoV) and characterized by a variety of signs and symptoms including: fever; chills and rigors; headache, malaise, and myalgias; shortness of breath; cough or other lower respiratory tract symptoms; and in some cases progressive pneumonia and adult respiratory distress syndrome (ARDS).

## **STANDARD PRECAUTIONS**

The use of specific work practices to prevent infections; including protective barriers, hand hygiene, and appropriate handling of clinical waste.